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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,593	04/09/2004	Richard Alan Morgal	MORGAL-11-CIP	1563

7590 01/16/2009

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ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
01/16/2009	PAPER

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/821,593
Filing Date: April 09, 2004
Appellant(s): MORGAL, RICHARD ALAN

William Boling
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/03/2008 appealing from the Office action mailed 11/26/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Pub WO 03/032404 of PCT US02/32550 (Morgal) w. International Search Report

Written Opinion Re: PCT US 02/32550 (Morgal)

Reply to written opinion Re: PCT US02/32550 (Morgal)

International Preliminary Examination Report Re: PCT US02/32550 (Morgal)

4,771,764	Cluff	8-1995
5,445,177	Laing et al.	8-1995
4,238,246	Genequand et al.	12-1980

Webster's Encyclopedic Unabridged Dictionary of the English Language, 1989 dilithium Press, Ltd., pp 1480

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4, 7-10, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cluff (4,771,764) in view of Laing et al. (US Patent 5,445,177).

In regard to claim 1, Cluff discloses a solar converter apparatus for converting incoming light to electricity (col.5; lines: 30-35) in Figure 1, comprising:

a) a support structure (32) for floating on a liquid bath (34), the structure having:

i) a substantially fixed relationship to an incoming light axis that is parallel to useful incoming light (col.4; lines: 39-51);

ii) motor (45) rotates an elevation rotation axis/moving mechanism at a fixed azimuth alignment angle (col. 4; lines: 63-68) from the incoming light axis, the support structure being rotatable/pivot about the elevation rotation axis (col.4; lines: 52-58), and

iii) depicted in Figure 13 and 14 are guidance interface (32) features connecting the support structure/system of connecting rods to a guidance frame (63) that aligns the elevation rotation axis (64) at the fixed azimuth

alignment angle to an azimuth of the source of incoming light/solar tracking, and that provide a rotation reference for the support structure (63) rotation about the elevation rotation axis (64) to align the incoming light axis with the source of incoming light/solar tracking (col.6; lines:40-47);

b) depicted in Figure 1 is at least one photovoltaic conversion device (42) mounted within the support structure (32) and adapted for converting concentrated sunlight into electricity (col.5; lines: 52-56); and

c) a lens (33) coupled to the support structure for guiding light that is parallel to the incoming light axis in Figure 1 and is received over a receiving region (40) toward a conversion device (42) that is mounted within the support structure (32), the conversion device (42) having an active area/solar cells (43) that is smaller than an area of the receiving region (40) (col.1; lines: 56-60).

Cluff disclose the liquid bath/pool (34) (col.3; lines: 44-47) that is in contact with an exterior of the support structure (32) (Figure 1 & col. 3; lines: 21-26), but fails to disclose the liquid bath as the coolant.

Laing et al. discloses a platform for solar power converting device as shown in Figure 1 (col. 1; lines: 7-10) and further discloses that waste heat can be absorbed by the water of the liquid layer/liquid bath and transferred to a heat exchanger and then cooling water/coolant can be fed via an open trough running along the periphery of the platform through a distributing system into the energy converting device (col.3; lines: 10-20). It would have been obvious to one of ordinary skill in the art at the time of the

invention to incorporate the liquid bath/water layer as the coolant as taught by Laing et al. to the solar converter device of Cluff in order to transfer the waste heat absorbed by the water to a heat exchanger and then send cooling water back into the energy converting device.

With respect to claim 2, Cluff discloses that the liquid bath (34) in Figure 1, wherein the photovoltaic mounting (43) which is encapsulated the lens structure (40) is on an inside of an exterior wall as shown in Figure 1 & 4, that in operation is in contact with the liquid bath/pool (34) at a point directly transverse the wall from a point of the mounting as shown in Figure 1.

With respect to claim 3, Cluff discloses that the support structure (32) is a first support structure (32), and is disposed in contact with a liquid bath (34) in an array of support structures (40), substantially abutting adjacent support structures(40) that each have an elevation rotation axis parallel to and in a plane with the elevation rotation axis of the first support structure (32) in Figure 1.

With respect to claim 4, Cluff discloses that the light parallel to the incoming light axis that enters with uniform density across an entire surface of the lens exits the lens at angles/orienting with respect to the incoming light axis (col.1; lines: 56-69), an average of all such exiting light angles defining a light delivery axis, the light delivery axis having a significant non-zero angle with respect to the incoming light axis (col.4; lines: 66-69) in Figure 1.

In regard to claim 7, Cluff discloses that the incoming light axis is aligned with a light source elevation angle in Figure 1, and the support structure (32) floats in a coolant

bath (34) that has an average surface plane (iv) a device (43) mounting site within the support structure (32), upon which a photovoltaic converter device (46) is mounted, which during operation is below the coolant bath (34) average surface plane for all light source elevation angles within 45 degrees from vertical in Figure 13 oriented at 45.

With respect to claim 8, Cluff discloses the method of collecting incoming light for conversion to electricity (col.5; lines: 30-35), comprising:

a) mounting a conversion device (43) at a mounting site within a support structure (32) having an elevation rotation axis;

b) coupling a lens (33) to the support structure (32) to concentrate and guide incident light arriving parallel to an incoming light axis toward the conversion device (43);

c) floating the support structure (32) on a liquid bath (34);

d) aligning the support structure (32) so that the elevation rotation axis (35, 45) is at an azimuth alignment angle with respect to a source of light energy (col.4; lines: 54-58); and

e) rotating the support structure (32) about the elevation rotation axis to align the incoming light axis toward the source of light energy (col.6; line: 3-10).

Cluff discloses the water cooled photovoltaic panels as the liquid bath (34) that is in contact with an exterior of the support structure (32) (Figure 1 & col. 3; lines: 21-26), but fails to discloses that the liquid bath provides for cooling of the conversion device (34).

Laing et al. discloses a platform for solar power converting device as shown in Figure 1 (col. 1; lines: 7-10) and further discloses that waste heat can be absorbed by

the water of the liquid layer/liquid bath and transferred to a heat exchanger and then cooling water/coolant can be fed via an open trough running along the periphery of the platform through a distributing system into the energy converting device (col.3; lines: 10-20). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the liquid bath/water layer as the coolant as taught by Laing et al. to the solar converter device of Cluff in order to transfer the waste heat absorbed by the water to a heat exchanger and then send cooling water back into the energy converting device.

In regard to claim 9, Cluff discloses wherein the support structure (32), lens (33) and conversion device (43) are part of a first collection pontoon/floats and the liquid bath (34) is a coolant bath having an average surface plane in Figure 1 comprising: cooling the conversion device (43) primarily through thermal contact between the liquid bath (34) and an exterior of the support structure (32).

Cluff also discloses the wall (49) having an interior (as shown in Figure 1& 4) upon which the conversion device(43) is mounted opposite an expected area of contact with the liquid bath(34), such that in operation at least one line perpendicular to the wall traverses the conversion device (43) mounting on an immediate inside of the wall (Figure 4) and the liquid bath (34) on an immediate outside of the wall (49) (col.6; lines: 3-10).

With respect to claim 10, Cluff discloses the first collection pontoon/floats in an array (40) with adjacent collection pontoons/floats that each has an elevation rotation

axis (45) parallel to and in a plane with the elevation rotation axis (45) of the support structure (32) of the first collection pontoon/floats (col.4; lines: 39-41).

In regard to claim 13, Cluff discloses positioning the conversion device (43) mounting site below the coolant bath (34) average surface plane for all light source elevation angles within 45 degrees from vertical as showing Figure 13.

With respect to claim 14, Cluff discloses incorporating a light source direction sensor within each pontoon (col.4; lines: 58-64).

Claims 5, 6, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cluff (4,771,764) and Laing et al. (US Patent 5,445,177) as applied to claim 1 above, and in further of view Genequand et al. (4,238,246).

In regard to claim 5, Cluff discloses the solar converter apparatus with a lens (Figure 1) as in claim 1 above, but fails to disclose the receiving region of the lens with a shadow toleration mechanism.

Genequand et al. discloses a photovoltaic conversion device (col.1; lines: 31-36) with a Fresnel lens (col.1; lines: 39-49), and further discloses the receiving region of the lens (11) with a shadow toleration mechanism (col. 2; lines: 6-23) that coordinates light entering through the lens with target photovoltaic conversion device to avoid substantially non-uniform illumination of operating photovoltaic conversion devices due to such shadowing. Genequand et al. teaches that in order to obtain greater concentration of solar energy adjacent to the Fresnel lenses on each side, as set of reflective slates termed a slide assembly so as to reflect incident solar rays onto the same focus as the focus of the Fresnel lens, and are spaced from each other in such a

way so as to not shadow the adjacent slide which is inclined at a slightly different angle (col.2; lines: 11-23). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the Fresnel lens as a set of slats inclined at an angle of Genequand et al. to the solar conversion device of Cluff in order to obtain greater concentration of solar energy.

In regard to claim 6, Cluff discloses the solar converter apparatus with a lens (Figure 1) as in claim 1 above, but fails to disclose a plurality of sub regions of the lens to target photovoltaic conversion device. Genequand et al. discloses a photovoltaic conversion device (col.1; lines: 31-36) with a Fresnel lens (col.1; lines: 39-49), and further discloses a plurality of sub regions/slats (39) of the lens that each receive light substantially parallel (Figure 1) to the incoming light axis over a corresponding receiving sub region/slats (39), wherein each sub region/slat (39) is configured to disperse the received light substantially uniformly over an entire surface of at least one corresponding target photovoltaic conversion device/ inner conduit (27). Genequand et al. teaches that in order to obtain greater concentration of solar energy adjacent to the Fresnel lenses on each side, as set of reflective slates termed a slide assembly so as to reflect incident solar rays onto the same focus as the focus of the Fresnel lens, and are spaced from each other in such a way so as to not shadow the adjacent slide which is inclined at a slightly different angle (col.2; lines: 11-23). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the Fresnel lens as a set of slats inclined at an angle of Genequand et al. to the solar conversion device of Cluff in order to obtain greater concentration of solar energy.

In regard to claim 11, Cluff discloses the solar converter apparatus with a lens (Figure 1) as in claim 8 above, but fails to disclose light delivery axis of the lens.

Genequand et al. discloses a light delivery axis (Figure 1) and has an angle with respect to the incoming light axis that is equal to an average angle of light exiting the lens when such light entered the lens parallel to the incoming light axis and uniformly distributed over an entire surface of the lens (Figure 1). Genequand et al. further discloses in his Figure the lens to have the light delivery axis at a significantly non-zero angle with respect to the incoming light axis. Genequand et al. teaches that in order to obtain greater concentration of solar energy adjacent to the Fresnel lenses on each side, as set of reflective slates termed a slide assembly so as to reflect incident solar rays onto the same focus as the focus of the Fresnel lens, and are spaced from each other in such a way so as to not shadow the adjacent slide which is inclined at a slightly different angle (col.2; lines: 11-23). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the Fresnel lens as a set of slats inclined at an angle of Genequand et al. to the solar conversion device of Cluff in order to obtain greater concentration of solar energy.

In regard to claim 12, Cluff discloses the solar converter apparatus with a lens (Figure 1) as in claim 8 above, but fails to disclose a multiplicity of receiving sub regions that receive light and disperse the light uniformly over the entire surface of the target conversion device.

Genequand et al. discloses the lens (11) has a light receiving region, further comprising a multiplicity of receiving sub regions/slats (39) (col. 3; lines: 32-38) that

each receive light arriving parallel to the incoming light axis, and that each disperse such received light substantially uniformly over an entire surface of a target conversion device/ inner conduit (27). Genequand et al. teaches that in order to obtain greater concentration of solar energy adjacent to the Fresnel lenses on each side, as set of reflective slates/multiplicity of sub regions (termed a slide assembly) so as to reflect incident solar rays onto the same focus as the focus of the Fresnel lens, and are spaced from each other in such a way so as to not shadow the adjacent slide which is inclined at a slightly different angle (col.2; lines: 11-23). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the Fresnel lens as a set of slats inclined at an angle of Genequand et al. to the solar conversion device of Cluff in order to obtain greater concentration of solar energy.

(10) Response to Arguments

Appellant argues that "Laing does not teach the cooling feature required by claims 1 and 8" (pp 8 of Appeal Brief).

The Examiner respectfully disagrees. As is seen by Figure 2 of Laing the support structure (13) is in thermal contact with the cooling liquid (9). It is clear from the disclosure of Lang that there is thermal transfer (cooling) through thermal contract with an exterior of the support structure as required by the instant claims (see Laing column 1, lines 7-10; column 3, lines 10-20; and Figures 1 and 2).

Appellant argues that “Cluff would not be combined with Laing in respect of relevant cooling features” (pp 10 of Appeal Brief).

The Examiner respectfully disagrees. Cluff teaches the structural limitations of the instant claims and further teaches the liquid bath/pool being in contact with the exterior of the support structure but does not specifically relate the pool to a coolant. Laing is relied upon merely as a general teaching of utilizing a liquid bath/pool as a coolant to cool a support structure through thermal contact with an exterior (Laing; column 1, lines 7-10 and column 3, lines 10-20). One of ordinary skill in the art would have looked to Laing as a general teaching of cooling design utilizing the already present liquid bath/pool.

Appellant argues the previously favorable examination of the instant rejected claims in a related case (PCT US/32550).

The Examiner notes that the prosecution of the PCT case and the instant application, though they may contain similar claims, does not alter the prosecution of the application at hand. The determination of patentability for a PCT and US application is not identical and therefore the favorable outcome of the preliminary search report of the PCT does not render the claims of the US application patentable over the prior art.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/S. G./

Examiner, Art Unit 1795

Conferees:

/Alexa D. Neckel/

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